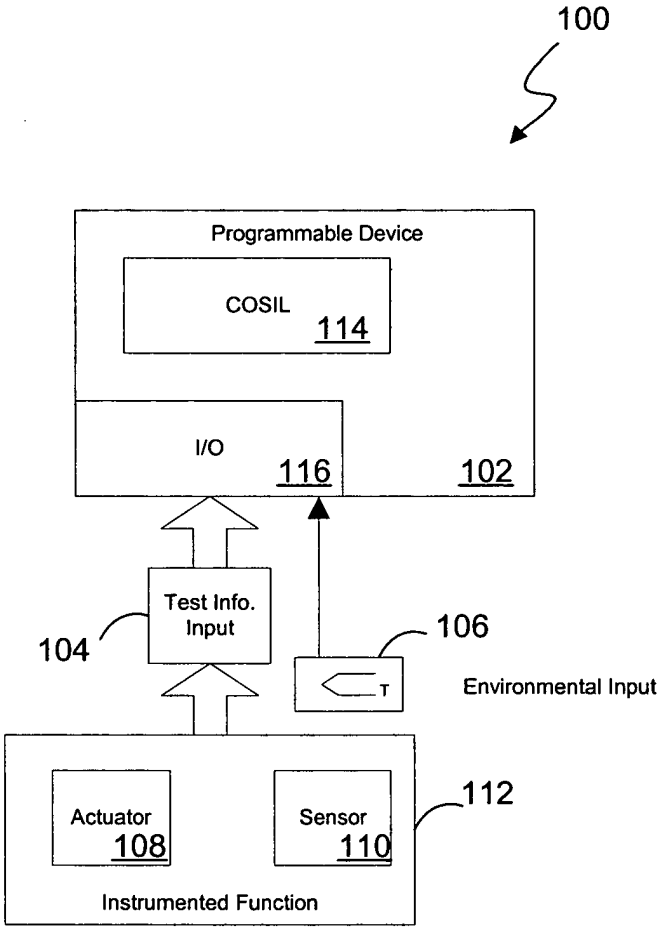
100
Programmable Device
COSIL
114
I/O
116
102
Test Info.
Input
104
106
T
Environmental Input
Actuator
108
Sensor
110
112
Instrumented Function

FIG. 1

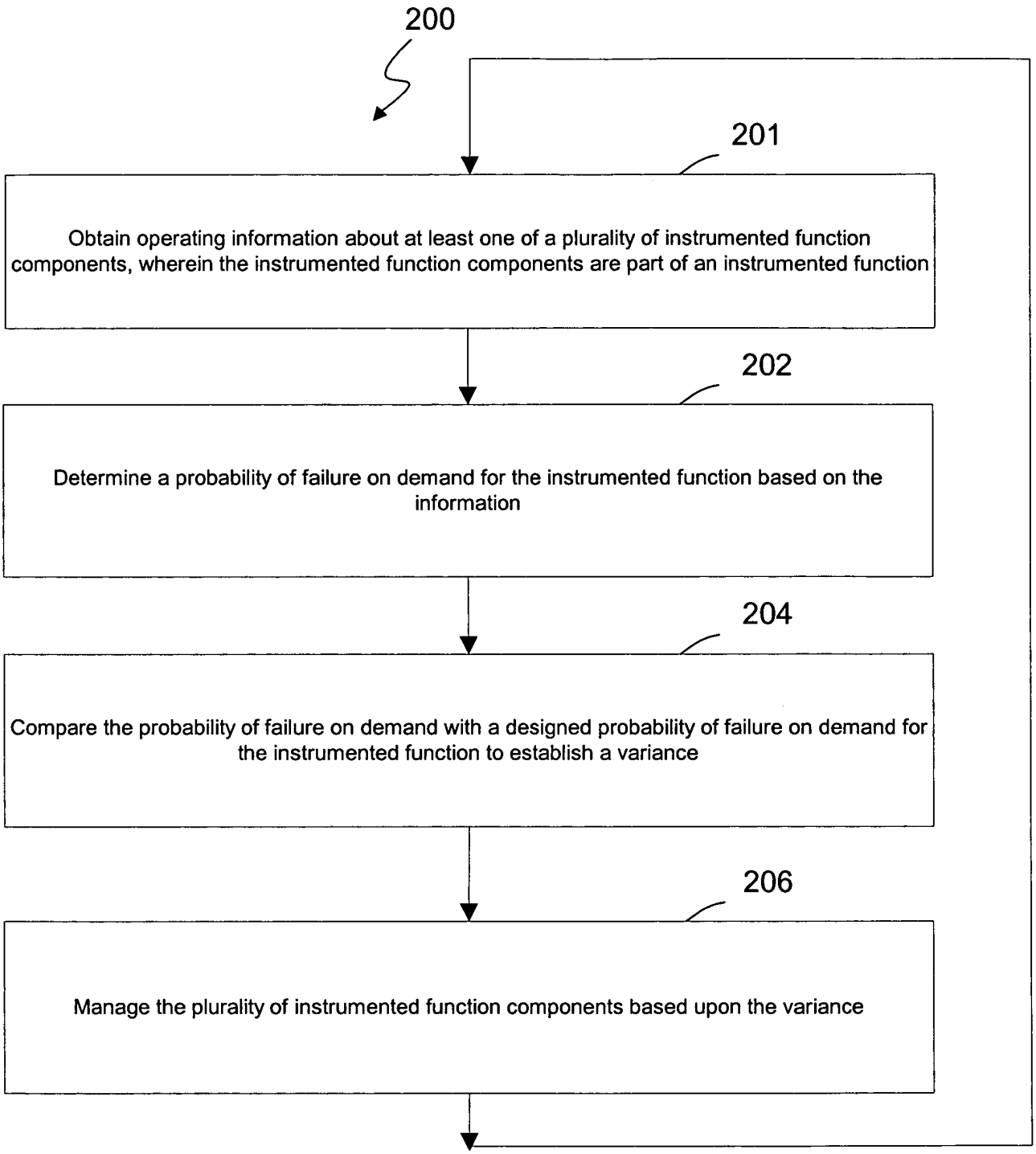
200
201
Obtain operating information about at least one of a plurality of instrumented function components, wherein the instrumented function components are part of an instrumented function
202
Determine a probability of failure on demand for the instrumented function based on the information
204
Compare the probability of failure on demand with a designed probability of failure on demand for the instrumented function to establish a variance
206
Manage the plurality of instrumented function components based upon the variance

FIG. 2

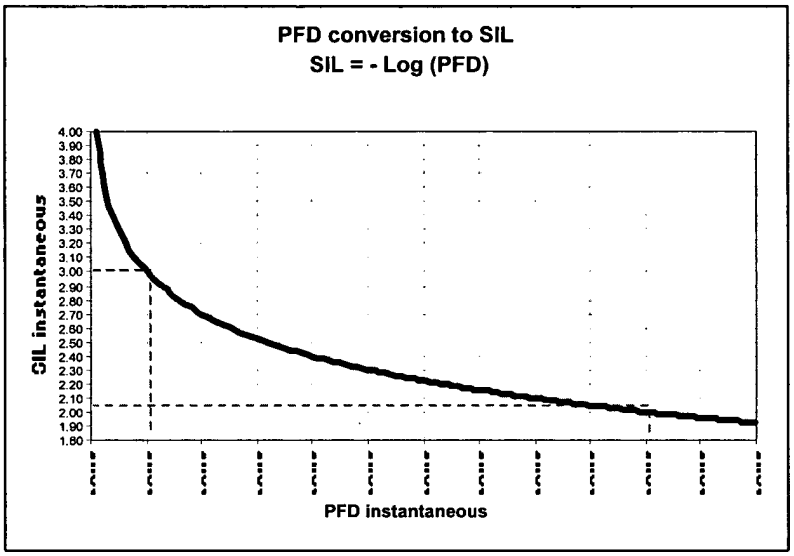
PFD conversion to SIL
SIL = - Log (PFD)
SIL instantaneous
4.00
3.90
3.80
3.70
3.60
3.50
3.40
3.30
3.20
3.10
3.00
2.90
2.80
2.70
2.60
2.50
2.40
2.30
2.20
2.10
2.00
1.90
1.80
PFD instantaneous

FIG. 3

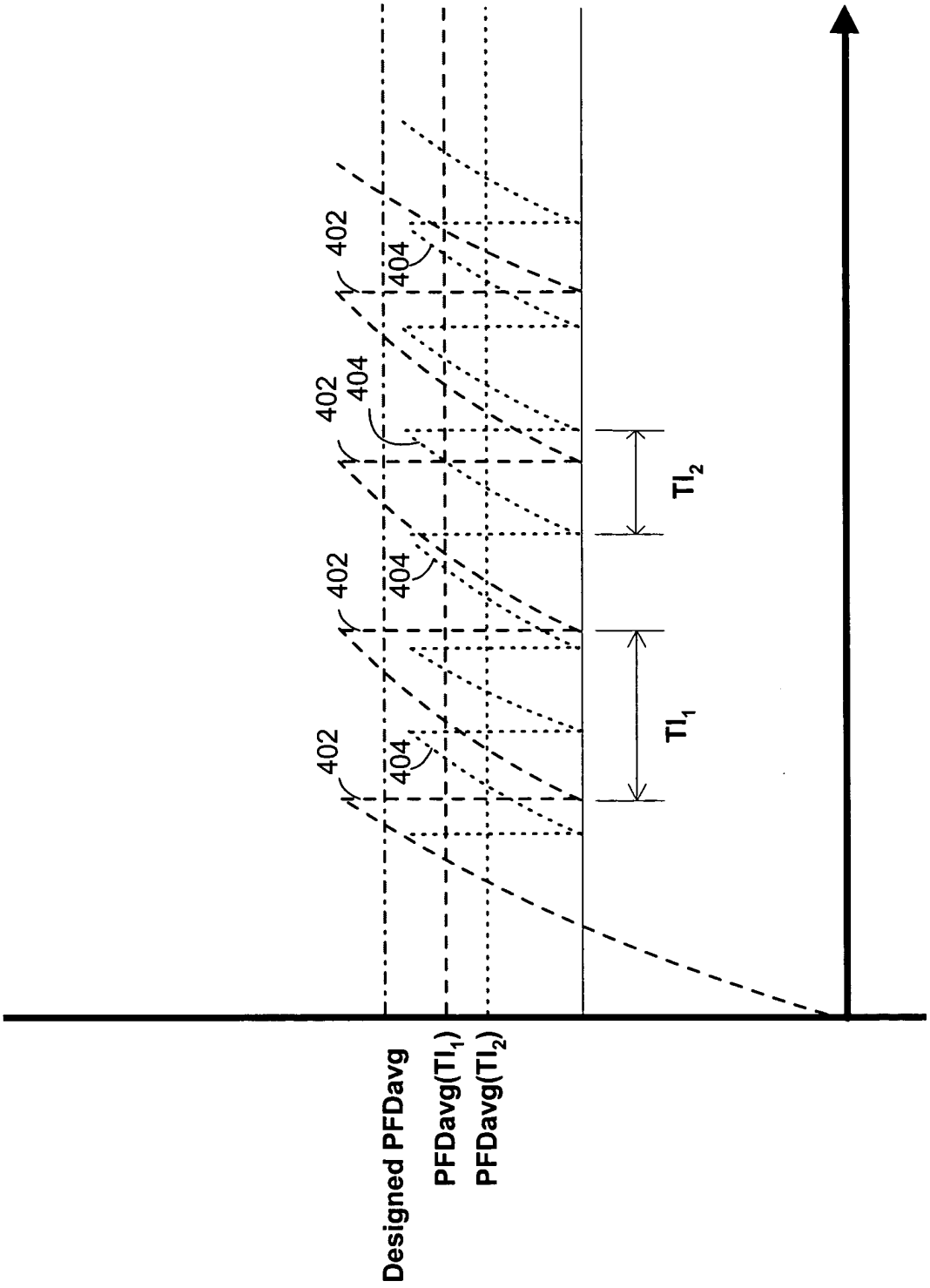
402
404
402
404
402
404
402
404
TI_2
TI_1
Designed PFDavg
PFDavg(TI_1)
PFDavg(TI_2)

FIG. 4

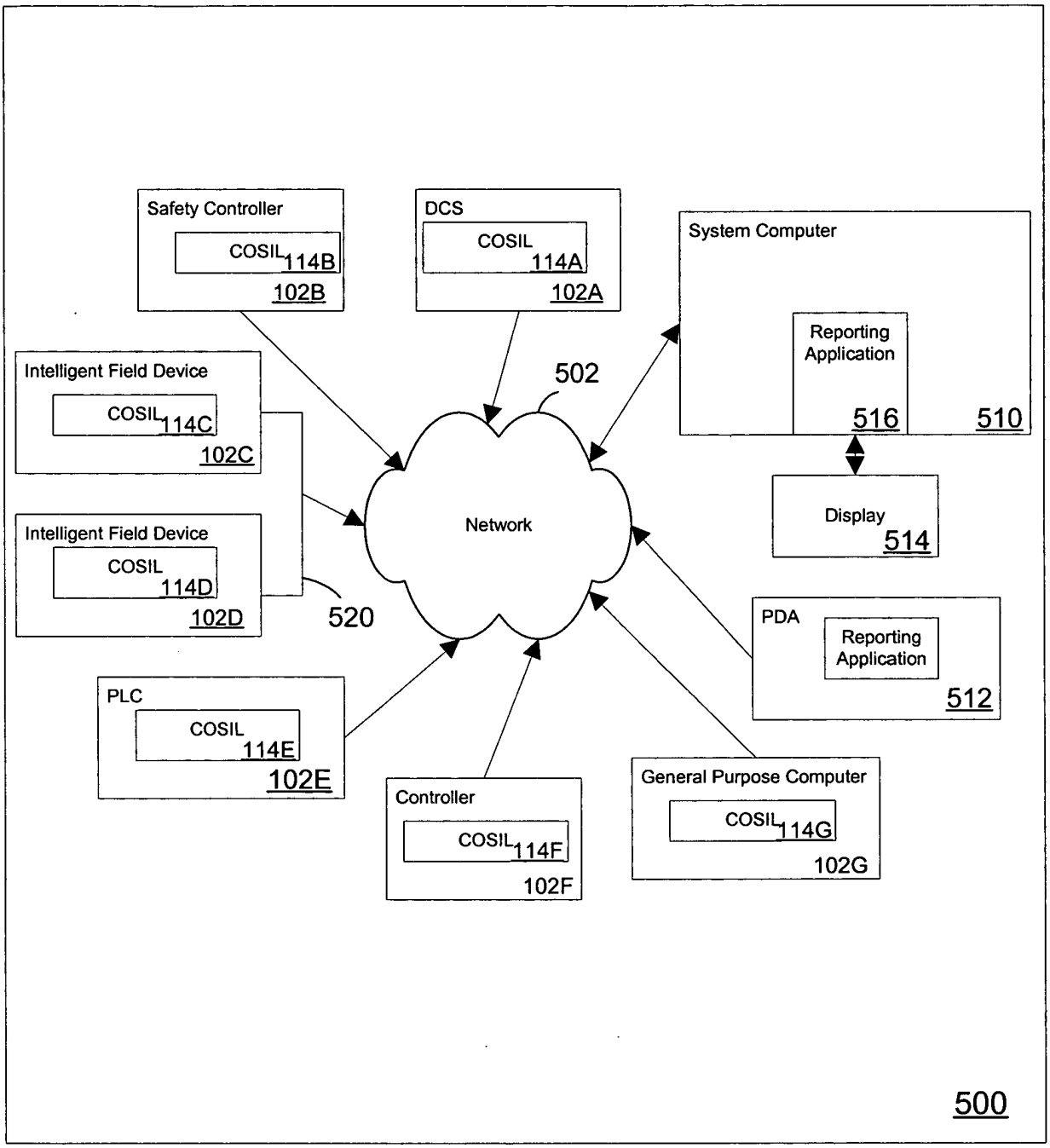
Safety Controller
COSIL 114B
102B
DCS
COSIL 114A
102A
System Computer
Reporting Application
516
510
Intelligent Field Device
COSIL 114C
102C
502
Intelligent Field Device
COSIL 114D
102D
520
Network
Display
514
PDA
Reporting Application
512
PLC
COSIL 114E
102E
Controller
COSIL 114F
102F
General Purpose Computer
COSIL 114G
102G
500

FIG. 5

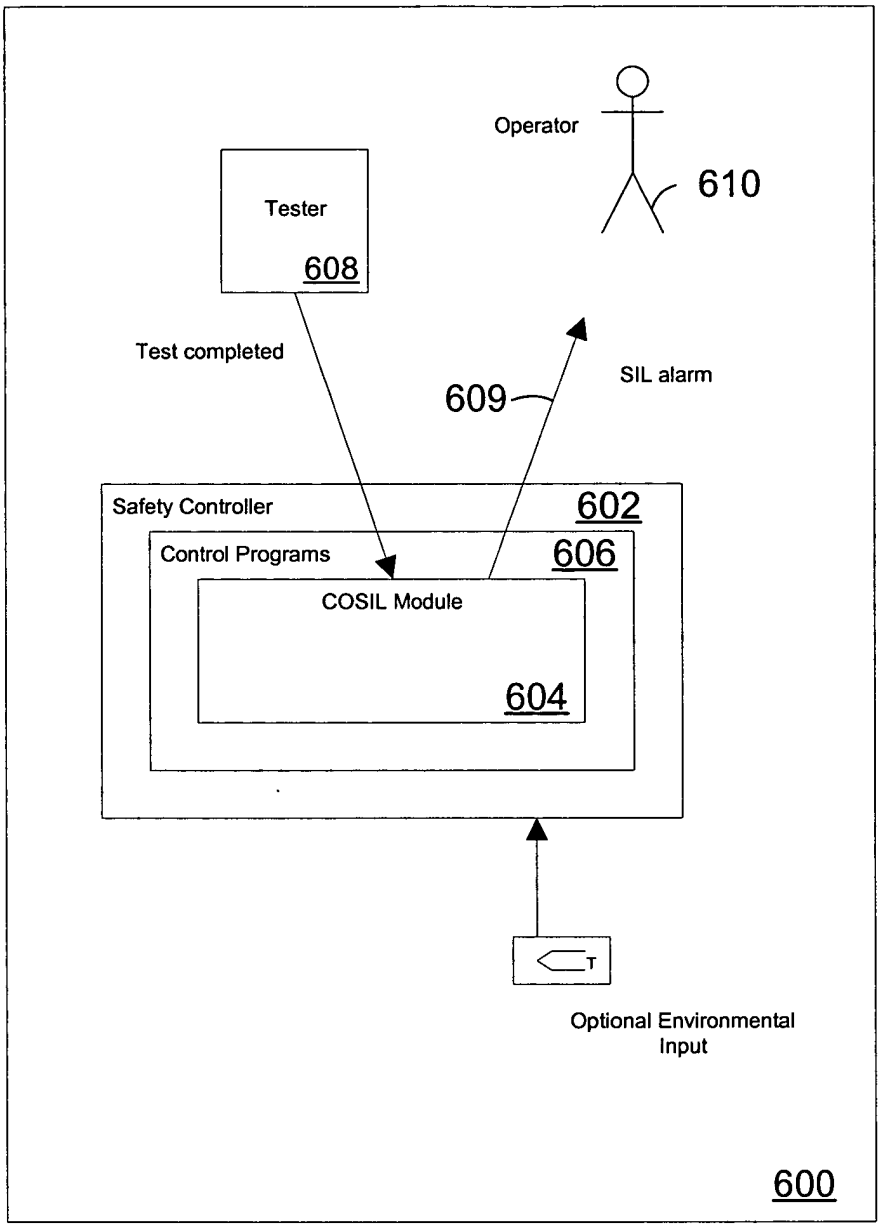
Operator
610
Tester
608
Test completed
609
SIL alarm
Safety Controller
602
Control Programs
606
COSIL Module
604
T
Optional Environmental Input
600

FIG. 6

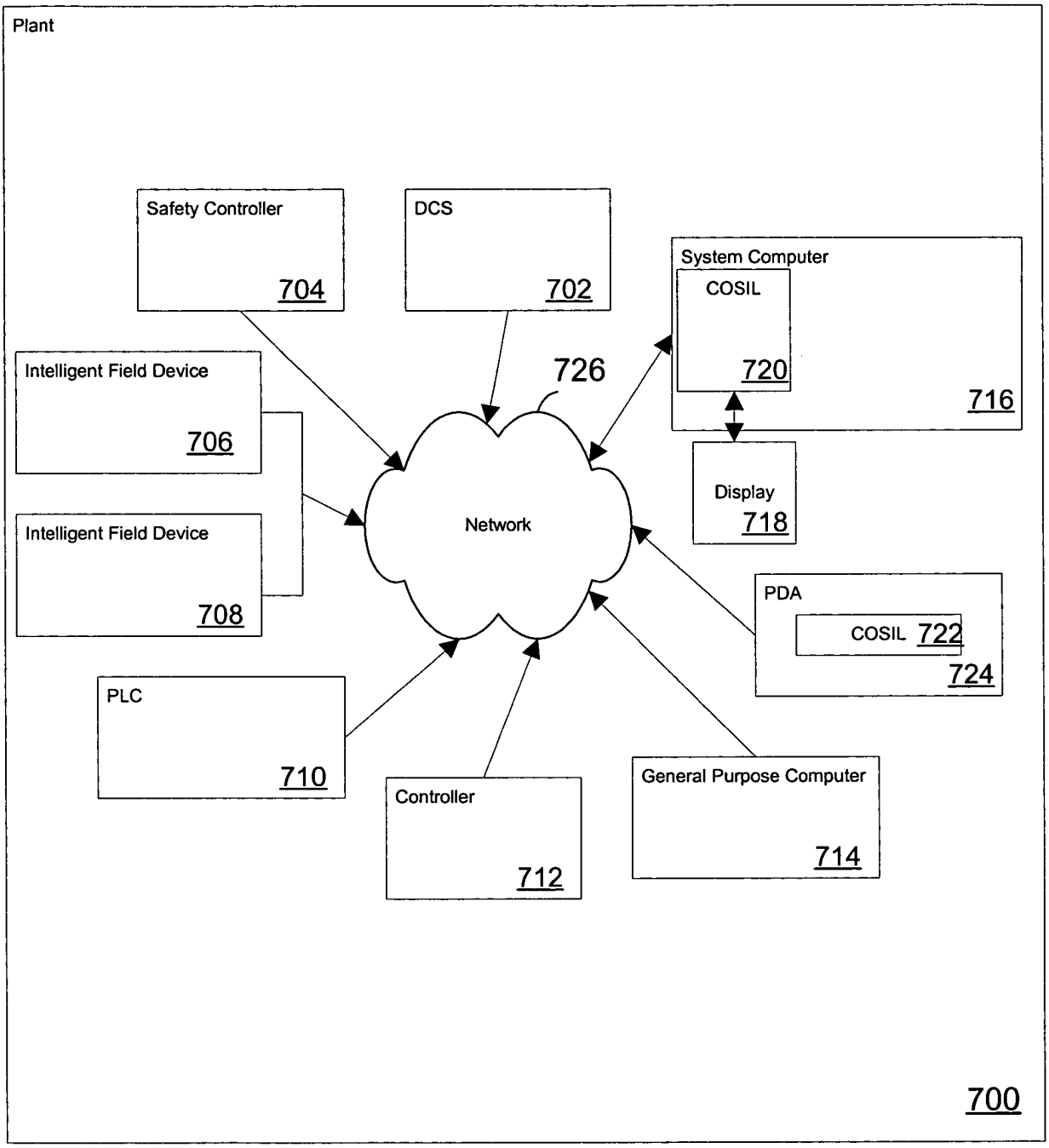
Plant
Safety Controller
704
DCS
702
System Computer
COSIL
720
716
726
Intelligent Field Device
706
Intelligent Field Device
708
Network
Display
718
PDA
COSIL 722
724
PLC
710
Controller
712
General Purpose Computer
714
700

FIG. 7

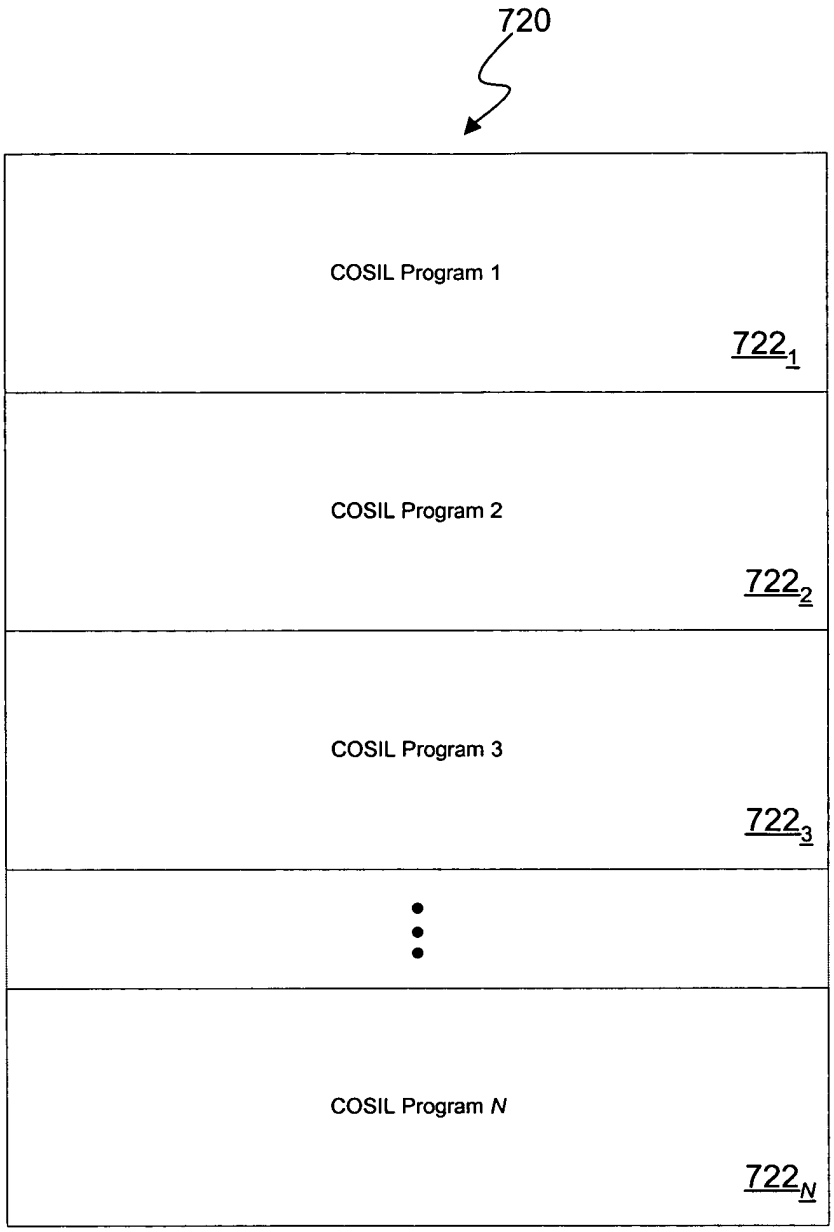
720
COSIL Program 1
722$_1$
COSIL Program 2
722$_2$
COSIL Program 3
722$_3$
COSIL Program *N*
722$_N$

FIG. 7A

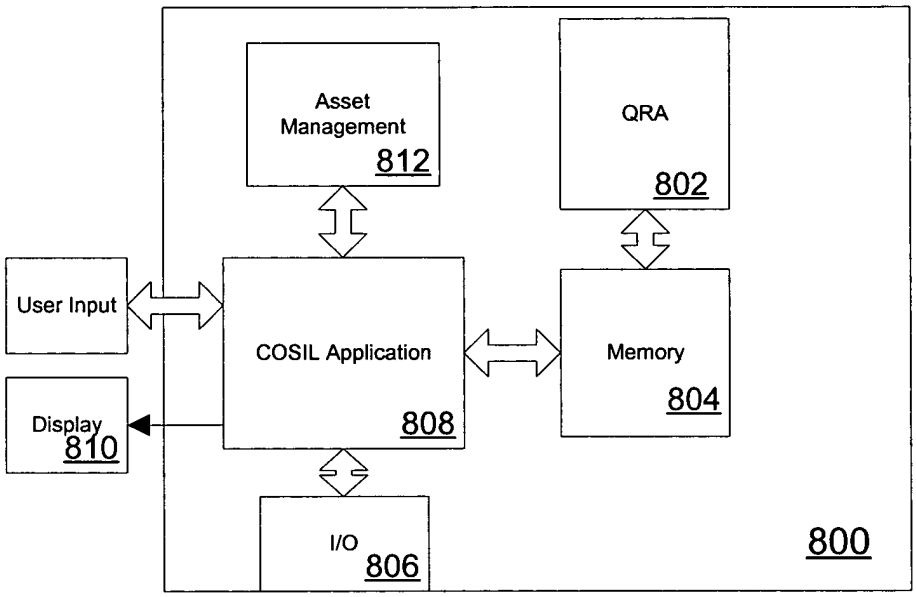
Asset Management
812
QRA
802
User Input
COSIL Application
808
Memory
804
Display
810
I/O
806
800

FIG. 8